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Ludwik Bierkowski and the early days of general anaesthesia in the Polish soil in February 1847

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Abstract

Ludwik Bierkowski belonged to the elite of surgeons of the first half of the 19th century. Educated in an excellent German university, Bierkowski had in-depth and comprehensive knowledge, a wide range of practical skills and was continuously eager to search for new solutions. He introduced cotton wool for wound dressings, experimentally determined the conditions of blood transfusions and published two outstanding anatomo-surgical atlases, which ranks him among the leading physicians of those days. Moreover, he was the first to use ether for effective general anaesthesia in the Polish lands, the procedure that changed the course of the history of medicine. Bierkowski performed ether anaesthesia in less than four months after the first world and in less than two months after the first European demonstration, which rates him among the most modern surgeons of those times. This year we celebrate the 170th anniversary of this event.

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Key words: history of medicine, anaesthesiology, surgery, ether

„We hasten to inform our Readers about the use of sulphuric ether vapour for respiration in order to momentarily anaesthetise patients to be operated on and about surgical procedures performed with its use, which are the issues currently absorbing all European physicians. On the 6th of this month and year in the morning hours, in the presence of Professor Czerwiakowski of the Medical Faculty, Dr Jaszczurowski of the department of surgery and Dr Zieleniewski of the medical department of assistants as well as several students, our Professor Bierkowski undertook the first experiment with sulphuric ether vapour for the purpose mentioned above" [1]*. That was the opening paragraph of the journalist report regarding the first official and, most importantly, successful attempt to use ether for general anaesthesia of a patient during surgery performed in the Polish lands. The experiment was carried out on 6 February 1847 in Cracow.

The introduction of an efficient agent abolishing surgical pain was undeniably a milestone in the history of medicine; not for nothing, the public surgery under ether anaesthesia performed in the Massachusetts General Hospital in Boston on 16 October 1846 is often called the birth of modern medicine. The procedure, frequently called "Boston surgery", was a transition into a completely new dimension of the art of medicine. Something appearing unattainable only yesterday became feasible. Theoretical surgical procedures considered in the past, which were tested on corpses, became real options in surgical practice. The field of surgery started to develop quickly; together with its development, the knowledge about agents and methods of pain abolishment were gradually emerging. The foundations of a new medical speciality, i.e. anaesthesiology, were shaped. "Ether surgeries" were started to be performed initially in the United States, then in Great Britain, France and German countries and the names of physicians conducting them often made the front pages of newspapers.

Understandably, the issues were also discussed in scientific journals. John Collins Warren in the United States, Robert Liston in Great Britain, Alfred Velpeau in France as well as Johann Ferdinand Heyfelder and Johann Friedrich

*non-verbatim translation from Polish

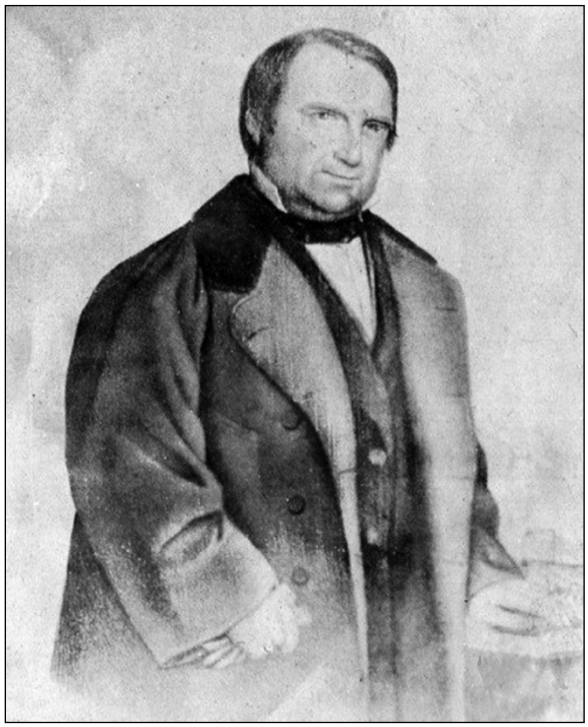
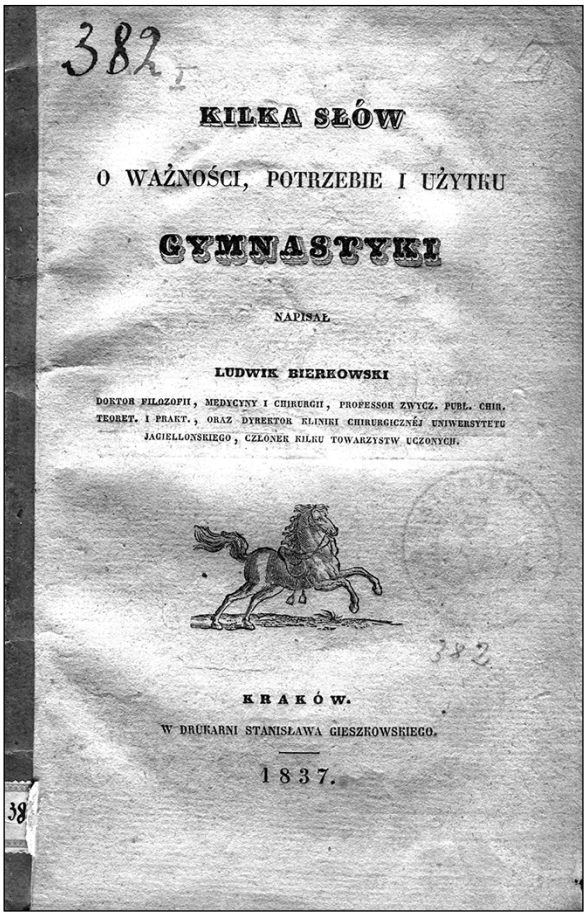


Figure 1. Professor Ludwik Bierkowski about1850 (author unknown). Collections of the Chair of History of Medicine

Dieffenbach in Germany, not to mention many others, tested the possibilities of general anaesthesia, outlining new trends in practical medicine [2, 3]. Ludwik Bierkowski, a Polish surgeon, was also among the pioneers (Fig. 1).

He was born in Poznań to the family of impoverished gentry. His family wanted him to become "a reviver" of the declining landing estate; hence the decision to enter the Agricultural Academy in Moegelin near Berlin. That was not a happy period of his life, as he felt drawn to life sciences, especially medicine. Finally, in 1821, after three years of agricultural studies, Bierkowski entered the medical faculty of the University in Berlin; with time, his decision was approved by his father. His interests were quickly focused on anatomy and surgery. Already during studies, he started preparations for publishing two atlases: anatomical-devoted to human circulatory and lymphatic systems and anatomo-surgical; his diligence and unquestionable talent were appreciated by his lecturers, among them the most outstanding physicians, such as Christof Hufeland, Graefe, Nepomucen Rust, Carl Aleksander Kluge or Philipp Siebold [4]. The first publication was issued already before and the second one just after receiving his medical diploma (1826). In 1828, Bierkowski was awarded the PhD title of the University in Jena. Two years later in Leipzig he received the title of Doctor in Medicine and Surgery for the dissertation *Dissertatio inauguralis medica sistens Moschi historiam naturalem et Medicim* etc. and decided to return to the Polish soil. Having nostrificated his diploma in surgery in Vilnius, he went to Warsaw and further to Cracow where he faced the prospect of becoming the head of the chair and department of surgery at the Jagiellonian University. Thanks to the letter of recommendation and strong support of Rust, Bierkowski (at that time under the age of 30 years) was awarded the title of Professor, although not without certain complications; there were some opinions demanding the public demonstration of surgery that would clearly and ultimately confirm that such a young candidate had appropriate qualifications. The candidate, on the other hand, demanded suitably high remuneration and reorganisation of surgical education curriculum of Cracow University, and considered both issues with all due solemnity. When ultimately the consensus was reached, the new head of the department appealed for a special leave to urgently go to Warsaw due to family matters. The university authorities were perfectly aware that the actual hidden intensions were to support actively the efforts of his compatriots in the Polish-Russian War of 1830–1831. The leave was granted; and he reportedly took all his students with him, except two — one of them was critically ill and the second student was forced to stay home by his family. With courage, devotion and deliberation he served his country operating on wounded soldiers, organising the field hospital under primitive conditions, teaching his assistants surgical skills. For his conduct and bravery, professor Bierkowski was awarded the Order Virtuti Military (Gold Cross) [5].

On return to Cracow, he set about working with energy and on a grand scale. He fully reorganised the teaching curriculum and the structure of the surgical department. A new curriculum of lectures was formulated, involving both practical and theoretical surgery. Fortunately, the manuscripts of textbooks prepared by students, assistants and Bierkowski himself have survived. They evidence the versatility of Bierkowski, who was famous for his almost perfect preparation for each procedure, which can be fully observed in in-depth medical case histories. Numerous other organization-related actions were undertaken to promote research and education. An anatomo-pathological room was created and developed during the next two decades, which contained a special collection of dry specimens and those in alcohol, gypsum casts and wax models, drawings and oil paintings illustrating the changes in various stages of a particular disease. The idea gained wide recognition [6]. The annual volume was to document the activities of the departments of surgery and obstetrics but also to present the newest surgical options and techniques. Moreover, the development of surgical instruments was of incessant concern; a so-called mechanic of the department of surgery working under strict supervision of Bierkowski was of considerable importance. Keeping up with the medical literature and "picking out" some interesting designs of sur-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KILKA SŁÓW

O WAŻNOŚCI, POTRZEBIE I UŻYTKU

GYMNASTYKI

NAPISAŁ

LUDWIK BIERKOWSKI

DOKTOR FILOZOFII, MEDYCYNY I CHIRURGII, PROFESSOR ZWYCZ. PUBL. CHIR. TEORET. I PRAKT., ORAZ DYREKTOR KLINIKI CHIRURGICZNEJ UNIWERSYTETU JAGIELLONSKIEGO, CZŁONEK KILKU TOWARZYSTW UCZONYCH.

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KRAKÓW.

W DRUKARNI STANISŁAWA GIESZKOWSKIEGO.

1837.

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Figure 2. The front page of the work by Bierkowski regarding gymnastics of 1837. Collections of the Chair of History of Medicine

gical instruments, Bierkowski ordered their constructions [7]. Some new instruments and machines were fully designed by him, e.g. a set of pliers for cleft lip surgeries. Thanks to his prudence, the department of surgery was equipped with an extensive array of instruments equally good as those used in the leading European centres.

In the beginning, the department was rather simple and basic; it was located on the ground floor of the building at Kopernika 7 Street. The first floor was occupied by the department of internal medicine headed by Professor Maciej Józef Brodowicz with 8 surgical and 4 maternity beds. With time, the possibilities of hospitalisation and ambulatory care of patients increased. Bierkowski managed to open an outpatient department and a so-called mobile clinic for the poorest patients. Full of strength and energy he founded the gymnastics school for the youth and defined its precise model of functioning based on the best French standards. Many years before Professor Henryk Jordan, Bierkowski promoted "healthy lifestyle"; the gymnastics school curriculum was widened with swimming classes, called the school of bathing, opened in summer and a skating rink for the winter period (Fig. 2). Unfortunately, despite efforts of the founder, the school functioned only several years due to financial and administrative difficulties, yet it was much longer remembered by the citizens of Cracow [8, 9].

Bierkowski continuously searched for new and better solutions, checked on achievements of other surgeons, meticulously gathered information and was ready, if need be, to take risks. Thanks to that, he was one of the pioneers of using surgical cotton wool for dressing wounds instead of the commonly applied lint; the assets of cotton wool dressings he observed during the War in 1831. Later, he used cotton wool regularly both in the surgical and outpatient department [10]. His interests were also focused on blood transfusions. He was particularly inspired by the studies concerning blood infusions performed by one of his teachers from Berlin, professor Graefe [11]. He was one of the first to construct the machines for blood transfusions directly from the donor into the recipient. It seems obvious that such a modern physician had to discern the birth of general anaesthesia.

Nowadays it is not possible to determine explicitly how and when Bierkowski learnt about possible use of ether for general anaesthesia. In Europe, the first procedures with anaesthesia were performed in Great Britain and France in the second half of December 1846. The surgery performed by Liston, a big name in medicine, enjoyed special renown. The procedure was carried out on 21st December and became a turning point in the history of European surgery. In German countries, ether anaesthesia started to be used in January 1847. There is much evidence that Johann Ferdinand Heyfelder from Erlanger was a pioneer in such procedures, followed by Franz Schuh who performed surgery under general anaesthesia in Vienne [12] (Fig. 3). The majority of reports in newspapers and medical literature considered ether anaesthesia a breakthrough; nevertheless, there were also opinions calling for moderation and caution. In 1847, the first legal regulations were introduced in Bavaria and Great Britain, according to which only suitably experienced and skilled surgeons had the right to perform surgeries under general anaesthesia. Moreover, the issue of potential side effects of ether was increasingly disputed; it was stressed that animal experiments were required to analyse the problem in depth. It should be assumed that Bierkowski, who systematically reviewed the medical literature, was fully aware of the ongoing discussion. As in other cases, he approached the issue with reserve and with the plan of action worked out beforehand.

We can suppose, although no one is quite sure, that Bierkowski prepared meticulously for surgery, as in other cases when he wanted to check the efficacy of a surgical method, which interested him. Unfortunately, no records prepared for this surgical procedure have been attainable. The only source of information is a thorough account in

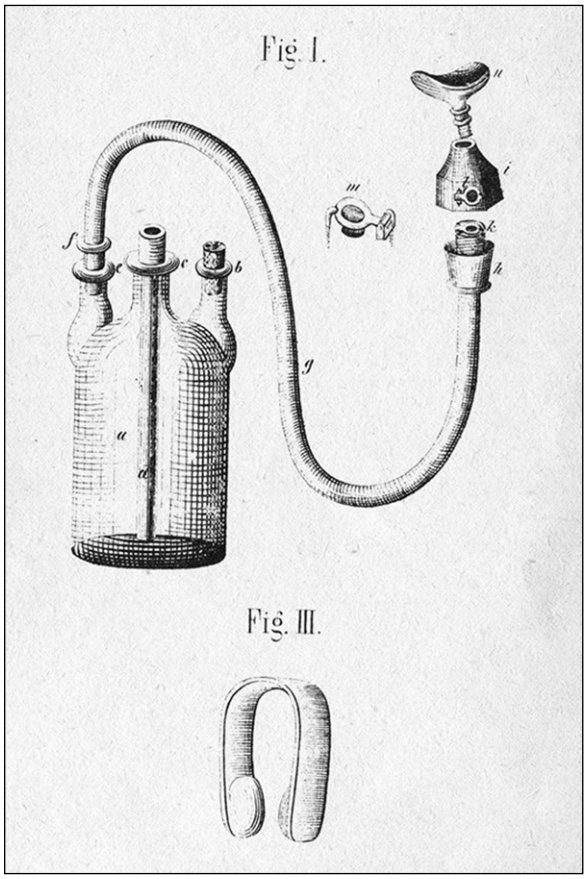

Figure 3. The drawing of the machine for ether Anaesthesia by Johann Ferdinand Heyfelder of 1837. The University Library in Erlangen: source: http://www.200.uk-erlangen.de/de/impressum/bildnachweis

"Gazeta Krakowska" of 9 February 1847, i.e. three days after the attempts with general anaesthesia. It is worth remembering that the journalist's report published, although in-depth, was intended for a wide range of readers and was not strictly medical, therefore lacked many medical details relevant for historians. Nevertheless, an attempt can be made to reconstruct the idea lying behind when Bierkowski decided to perform a clinical experiment with ether on 6 February 1847 (Saturday afternoon) (Fig. 4). In the presence of Professor Ignacy Czerwiakowski, physicians and students, Bierkowski performed a two-stage surgical procedure. In his characteristic and outstanding manner, he started the demonstration administering ether anaesthesia firstly to two students of the Faculty of Medicine to determine the sensitivity to pain and to calculate the time of anaesthesia and recovery. According to "Gazeta Krakowska", "Firstly, two students volunteered to take part in the attempts at producing this kind of anaesthesia. The sequence of events was as follows: A.O., a candidate of medicine, breathed with ether vapour for one minute and 47 seconds, which left him stupefied; his eyelids were spontaneously heavy with sleep and his sensations were

Figure 4. A metal bottle of ether. Source: https://commons.wikimedia.org/wiki

so diminished that repeated pinpricking caused no pain at all. J.S., another candidate of medicine, breathed with ether for 2 minutes and 30 seconds, which induced a daze and a very pleasant dream; he was insensible to pinpricking of his right hand. He came round in 3 minutes and 3 seconds and was extremely puzzled that such a deep pricking did not cause any pain".

Both attempts described above were positive and uneventful. Most likely, Bierkowski wanted to test the actual possibilities and possible adverse effects of the anaesthetic. Having obtained the necessary information, he decided to take the next step, i.e. the surgical procedure itself. Two patients of both genders and various ages were selected, clearly to compare the circumstances and consequences of such procedures. It is impossible to determine whether and to what extent he based on the available reports or exclusively on his own observations. Nevertheless, all attempts were successful and both ether and chloroform introduced later were routinely used in his department in subsequent months and years [4]. It is worth mentioning that on 24 February, i.e. three weeks later, Franciszek Groer performed a risky procedure of amputation of both shins in the Hospital of Orthodox Jews in Warsaw; however, the public was not informed about this surgery until summer („Tygodnik Lekarski") [13]. Another surgeon from Warsaw, Professor Aleksander Le Brun introduced general anaesthesia as a standard procedure in his department; by the end of 1847, he was the first to use chloroform in the Polish lands. A new chapter in the history of surgery and entire medicine was initiated.

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